

## Applied Economic Insights

# Who Will Harvest? Immigration Policy and Labor Dependence in Florida's Specialty Crop Sectors

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### Abstract

Florida's nursery, greenhouse, and floriculture (NGF) sector and fruit and vegetable (FV) sector are among the most labor-intensive in US agriculture, with hired labor comprising 25%–40% of production costs. Both depend heavily on unauthorized workers. Using a transparent simulation framework, we estimate the short-run effects of deporting 25%–75% of unauthorized workers. Results show substantial increases in production costs, reduced output, sales losses, and significant job cuts in both sectors. These findings underscore the sectors' vulnerability to mass deportation and highlight the urgent need for multipronged responses.

## 1 Introduction

Florida is home to two of the most labor-intensive agricultural sectors in the United States: nursery, greenhouse, and floriculture (NGF) production and fruit and vegetable (FV) production. Together, these industries generate billions of dollars in annual sales and support tens of thousands of jobs. In 2019, sales from all horticultural specialty operations in Florida totaled \$1.93 billion (USDA-NASS 2019), while combined 2023 cash receipts for fruits, nuts, vegetables, and melons were approximately \$2.76 billion (USDA-ERS 2024). Florida ranked first nationwide in 2023 in the value of production for several crops, most notably floriculture, Valencia oranges, watermelons, and sweet corn—accounting for 18 percent, 51 percent, 34 percent, and 25 percent of US totals, respectively. The state ranked second for crops such as bell peppers (31 percent), total oranges (Valencia and non-Valencia, 20 percent), strawberries (13 percent), and field-grown tomatoes (18 percent), among others, and third for cabbage (12 percent) and grapefruit (28 percent) (FDACS 2023).

Despite differences in product lines—ornamental plants versus edible crops—both sectors share a critical vulnerability: They depend heavily on hired labor. Labor costs account for about 40 percent of total production expenses in NGF operations (USDA-NASS 2019) and roughly 23–30 percent in FV operations, based on crop-level cost-and-return estimates (Simnitt and Martin 2022). This contrasts sharply with the average for all US farms, where hired labor represents about 12 percent of production expenses (USDA-ERS 2025). In NGF production, skilled workers are needed year-round for propagation, transplanting, pruning, and nutrient and pest management. In FV production, large seasonal crews are required at planting and especially at harvest, where delicate handling and selectivity make mechanization impractical for many crops.

Nationally, about 40–45 percent of crop workers lack legal status (US Department of Labor 2023). This dependence on a vulnerable labor force leaves both sectors highly exposed to sudden shifts in immigration policy. A large-scale deportation of unauthorized workers, now reemerging in the national political debate, could abruptly remove a substantial share of the workforce, triggering immediate increases in production costs, reductions in output, lost sales, and employment disruptions. These effects

would ripple beyond farms, affecting supply chains and local economies throughout Florida and beyond (Smith 2025).

Our analysis is deliberately simple: a transparent calculation approach intended to illustrate the potential order of magnitude of such impacts, not to forecast precise outcomes. We simulate short-run changes in costs, output, sales, and employment under deportation scenarios affecting 25–75 percent of unauthorized workers. By focusing on two of Florida’s most labor-dependent agricultural sectors, we highlight the scale of potential policy-induced disruptions and provide policymakers, industry stakeholders, and the public with an objective view of what is at stake in the immigration policy debate.

## 2 Sectoral Overview

### 2.1 Nursery, Greenhouse, and Floriculture (NGF)

Table 1 shows that sales in Florida’s NGF sector fell slightly between 2009 and 2014 but rose sharply by 2019, increasing 31 percent from the 2014 level. The number of operations peaked in 2014 at just over 2,000 but fell by 18 percent to 1,689 by 2019, suggesting consolidation in the sector. Total expenses followed a similar pattern to sales, with hired labor consistently accounting for about 39–40 percent of production costs across all three years in the Census of Horticultural Specialties. The sector employed between 24,000 and 28,000 hired workers during this period, with the majority (65–73 percent) working 150 days or more per year, underscoring the industry’s reliance on year-round labor. The sector employed between 6,726 and 8,840 seasonal workers (<150 days, 27–35 percent), reflecting significant seasonal labor needs. Recruiting these workers from local/domestic markets is challenging due to limited availability. Additionally, seasonal labor supply often correlates with poverty, as it depends on inconsistent yearly employment.

**Table 1. Florida nursery, greenhouse, and floriculture sector indicators, 2009–2019**

Year	Sales (\$1,000)	Operations (#)	All Expenses (\$1,000)	Hired Labor Expenses (\$1,000)	Hired Workers (#)	Hired Workers <150 Days (#)	Hired Workers ≥150 Days (#)
2009	2,132,903	1,882	1,704,084	684,351	24,206	6,726	17,480
2014	2,027,630	2,069	1,380,225	562,863	27,015	8,840	18,175
2019	2,664,515	1,689	2,066,847	816,634	27,969	8,259	19,710

*Note:* Sales, expenses, and labor expenses adjusted to 2024 dollars using the Producer Price Index for Farm Products (WPU01).

*Source:* USDA-NASS (2009, 2014, 2019), Census of Horticultural Specialties.

### 2.2 Fruit and Vegetables

Table 2 shows that cash receipts for Florida’s fruit and vegetable (FV) farms fell from \$4.21 billion in 2012 to \$2.57 billion in 2022, a 39 percent decline with no signs of recovery. The number of specialty crop farms contracted from 8,214 to 5,564, reflecting consolidation in the sector. Labor expenses remained a major cost component, accounting for 33–38 percent of specialty crops’ total expenses over the decade. Employment in the FV sector also dropped by 35 percent, from about 52,000 to 34,000 hired workers, with the majority employed fewer than 150 days per year—highlighting the sector’s dependence on large seasonal harvest crews. This reliance is especially acute in labor-intensive crops such as tomatoes, berries, and citrus, where hand-harvesting remains standard and mechanization is often infeasible due to quality and selectivity requirements. These structural changes—declining receipts, farm consolidation, fluctuating but still high labor costs, and a shrinking workforce—have left the sector

increasingly vulnerable to sudden labor supply disruptions. Immigration policy reform therefore remains a critical determinant of the sector’s future viability.

**Table 2. Florida fruit and vegetable sector indicators, 2012–2022**

Year	Cash Receipts <sup>a</sup> (\$1,000)	Farms <sup>b</sup> (#)	Total Cash Expenses <sup>b</sup> (\$1,000)	Labor Expenses <sup>b</sup> (\$1,000)	Fruits & Vegetable Hired <sup>c</sup> Labor (#)	Hired Workers <150 <sup>c</sup> Days (#)	Hired Workers ≥150 <sup>c</sup> Days (#)
2012	4,206,669	8,214	3,807,335	1,457,446	52,387	34,734	17,653
2017	3,864,290	5,519	4,702,853	1,757,531	41,882	25,907	15,975
2022	2,572,246	5,564	3,232,389	1,077,440	34,080	18,718	15,362

Note: All dollar values are adjusted to 2024 dollars using the Producer Price Index for Farm Products (WPU01).

Source:

<sup>a</sup> USDA-ERS (2025b).

<sup>b</sup> USDA-ERS (2025a).

<sup>c</sup> USDA NASS. 2012, 2017, 2022 Census of Agriculture – Florida State and County Data. NAICS code 1112 for vegetable and melon farming and NAICS code 1113 (fruit and tree nut farming).

### 3 Methodology

We use a simple, transparent approach to illustrate the short-run economic impacts of removing unauthorized workers from Florida’s nursery, greenhouse, and floriculture (NGF) sector and the fruit and vegetable (FV) sector. The goal is to provide an order-of-magnitude illustration, not a precise forecast.

#### 3.1 Framework

The calculation proceeds in three steps:

- (1) Labor loss share: Let  $u$  = the share of hired workers who are unauthorized. Based on the US Department of Labor, NAWS 2021–2022, we set  $u = 0.40$  (40 percent). Note that we do not have Florida-specific estimates for the share of unauthorized workers in the NGF and FV sectors. We are assuming the share of unauthorized workers to be 40 percent for illustrative purposes. Let  $d$  = the deportation intensity (0.25, 0.50, 0.75). The share of the total hired workforce lost is  $Labor\ loss\ share = u \times d$ .
- (2) Cost shock: Let  $s_l$  = the share of total production expenses attributable to hired labor. For NGF operations, the 2019 Census of Horticultural Specialties reports  $s_l \approx 0.40$  (40 percent). And for FV operations,  $s_l \approx 0.265$ , calculated as the average of 0.30 for fruits and tree nuts and 0.23 for vegetables and melons (Simnitt and Martin 2022). The percentage cost shock from labor loss is  $Cost\ shock\ (\%) = s_l \times u \times d \times 100$ .
- (3) Output, sales, and job changes: Let  $\varepsilon_{cq}$  = the short-run cost elasticity of supply. The change in output is  $\% \Delta Q = \varepsilon_{cq} \times Cost\ shock\ (\%)$ . Lost sales (\$) are  $Lost\ sales = Baseline\ sales \times \left(\frac{\% \Delta Q}{100}\right)$ . Lost jobs (#) are  $Lost\ jobs = Baseline\ hired\ workers \times \left(\frac{\% \Delta Q}{100}\right)$ . Note that lost sales and jobs are being modelled as proportional to the change in output.

It is likely that deportation-driven labor shortages could put upward pressure on wages for remaining workers. Our framework does not consider such wage effects. A more comprehensive model could endogenize wage adjustments through labor supply and demand elasticities, as well as account for output variations based on input substitutability (e.g., between labor and capital or mechanization).

### 3.2 Imputing the Cost Elasticity of Supply

To translate a labor cost shock into an output change, we require a short-run cost elasticity of supply for each of the two sectors in our analysis (NGF and FV). No Florida-specific estimates are available, so we impute both values from published national studies. The elasticity is defined as the percentage change in output divided by the percentage change in production costs,  $\epsilon_{cq} = \frac{\% \Delta Q}{\% \Delta Cost}$ .

For NGF, we use Zahniser et al. (2012), who simulate a 40 percent reduction of unauthorized labor (Simulation 2), causing agricultural wages to increase by 3.9 percent. For greenhouse and nursery ( $s_l = 0.46$ ) this results in a 3.5 percent decrease in output due to higher costs, limited input substitutability, and reduced export competitiveness. We impute a total cost increase of about 1.8 percent by multiplying the wage change by the labor cost share. Dividing the output change by the cost change yields a short-run cost elasticity of supply of approximately  $-1.9$ . A short-run cost elasticity of supply of  $-1.9$  is interpreted as follows: A 1 percent increase in cost decreases output by 1.9 percent, *ceteris paribus*.

For FV, we rely on O’Brien, Kruse, and Kruse (2014). They simulate the deportation of unauthorized workers, leading to a 50 percent reduction in hired farm labor (Alternative 1). This labor shock causes a 70 percent increase in wages due to scarcity. Higher costs cause the output in the fruit sector ( $s_l = 0.48$ ) to fall by 30 percent and that of the vegetable sector ( $s_l = 0.35$ ) to fall by 23 percent. We impute a cost increase of roughly 33.6 percent for fruits and about 24.5 percent for vegetables by multiplying the wage change by the labor cost shares. And dividing the output change by the cost change yields a cost elasticity of supply of  $-0.90$  for fruit and  $-0.93$  for vegetables. Averaging fruit and vegetable elasticities yields  $-0.92$ .

These imputed elasticities implicitly capture some input substitution effects from the source studies’ modeling framework. For instance, labor demand elasticities in O’Brien, Kruse, and Kruse (2014) and substitution parameters between labor and other inputs in Zahniser et al.’s (2012) CGE framework. Our focus remains on short-run constraints, where abrupt deportations limit adaptation time. That said, our sensitivity analysis (varying cost elasticity of supply from  $-0.8$  to  $-2.5$  for NGF and  $-0.5$  to  $-1.5$  for FV) explores a range of responses, including more muted ones consistent with potential substitution effects.

**Table 3. Simulating deportation of 50 percent unauthorized workers in the NGF industry**

<b>Data</b>	
Baseline nursery & greenhouse sales (\$1,000)	2,664,515
Labor cost share	0.4
Share of workers who are unauthorized	0.4
Assumed unauthorized labor removal (%)	50
Short-run cost elasticity of supply	-1.9
Baseline authorized nursery employment	27,969
Baseline authorized + unauthorized employment	39,156.6
<b>Predicted Change</b>	
Cost shock (%)	8.00
Output (%)	-15.20
Lost NGF sales (\$1,000)	-405,006.25
Estimated jobs lost	-5,951.80

## 4 Results

### 4.1 Nursery, Greenhouse, and Floriculture (NGF)

Table 3 summarizes the baseline simulation for the NGF sector using 2019 Census of Horticultural Specialties data. In that year, Florida’s NGF operations generated \$2.66 billion in sales and employed 27,969 authorized hired workers. Including the estimated 40 percent of workers who were unauthorized brings the total workforce to roughly 39,157. With hired labor accounting for 40 percent of production costs, removing half of the unauthorized workforce generates an 8 percent increase in production costs. Applying the imputed short-run cost elasticity of supply (-1.9) translates this cost shock into a 15.2 percent reduction in output, equivalent to about \$405 million in lost sales. Employment contracts by an estimated 5,952 jobs, reflecting the labor-intensive nature of NGF production and the limited short-run ability to replace lost workers with mechanization.

Table 4 presents the sensitivity analysis, which varies both the share of unauthorized workers removed (25, 50, and 75 percent) and the short-run cost elasticity of supply (-0.8, -1.9, -2.5). Even under the lowest elasticity and smallest deportation scenario (-0.8 elasticity, 25 percent removal), the sector experiences an output loss of 3.2 percent (\$85 million) and more than 1,200 jobs lost. At the upper bound (-2.5 elasticity, 75 percent removal), output contracts by 30 percent, equivalent to nearly \$800 million in lost sales and over 11,700 jobs lost. Across all cases, the results highlight the high vulnerability of the NGF sector to labor supply shocks, with losses scaling sharply as both deportation intensity and cost elasticity of supply increase.

**Table 4. Sensitivity analysis for simulating deportation of unauthorized workers in the Florida green industry**

$\epsilon_{cg} \setminus d$	Share of Unauthorized Workers Deported		
	25%	50%	75%
-0.8	% $\Delta Cost$ = 4% % $\Delta Q$ = -3.20% $\Delta Sales$ = -85,264 Jobs Lost = -1,253	% $\Delta Cost$ = 8% % $\Delta Q$ = -6.4% $\Delta Sales$ = -170,528 Jobs Lost = -2,506	% $\Delta Cost$ = 12% % $\Delta Q$ = -9.60% $\Delta Sales$ = -255,793 Jobs Lost = -3,759
-1.9	% $\Delta Cost$ = 4% % $\Delta Q$ = -7.60% $\Delta Sales$ = -202,503 Jobs Lost = -2,975	% $\Delta Cost$ = 8% % $\Delta Q$ = -15.20% $\Delta Sales$ = -405,006 Jobs Lost = -5,951	% $\Delta Cost$ = 12% % $\Delta Q$ = -22.80% $\Delta Sales$ = -607,509 Jobs Lost = -8,927
-2.5	% $\Delta Cost$ = 4% % $\Delta Q$ = -10.00% $\Delta Sales$ = -266,451 Jobs Lost = -3,915	% $\Delta Cost$ = 8% % $\Delta Q$ = -20.00% $\Delta Sales$ = -532,902 Jobs Lost = -7,831	% $\Delta Cost$ = 12% % $\Delta Q$ = -30.00% $\Delta Sales$ = -799,354 Jobs Lost = -11,746

### 4.2 Fruits and Vegetables (FV)

Table 5 summarizes the baseline simulation for Florida’s fruits and vegetables sector using 2022 Census of Agriculture data. In that year, Florida’s fruit and vegetable farms generated \$2.57 billion in sales and employed 34,080 authorized hired workers. Including an estimated 40 percent unauthorized labor, brings the total workforce to about 47,700. With hired labor accounting for 26.5 percent of costs, removing half of the unauthorized workforce generates a 5.3 percent increase in production costs. Applying the short-run cost elasticity of supply (-0.92) translates this into a 4.9 percent decline in output,

equivalent to roughly \$125 million in lost sales. Employment falls by an estimated 2,326 jobs, underscoring the sector’s dependence on seasonal hand labor and limited ability to mechanize harvesting.

**Table 5. Simulating deportation of 50 percent unauthorized workers in the FV industry**

<b>Data</b>	
Baseline FV sales (\$1,000)	2,572,246
Labor cost share	0.265
Share of workers who are unauthorized	0.4
Assumed unauthorized labor removal (%)	50
Short-run cost elasticity of supply	-0.92
Baseline authorized FV employment	34,080
Baseline authorized + unauthorized employment	47,712
<b>Predicted Change</b>	
Cost shock (%)	5.30%
Output (%)	-4.88%
Lost FV sales (\$1,000)	-125,422.73
Estimated jobs lost	-2,326

**Table 6. Sensitivity analysis for simulating deportation of unauthorized workers in the Florida FV industry**

$\epsilon_{cq} \backslash d$	Share of Unauthorized Workers Deported		
	25%	50%	75%
-0.5	% $\Delta Cost$ = 2.65% % $\Delta Q$ = -1.33% $\Delta Sales$ = -34,082 Jobs Lost = -632	% $\Delta Cost$ = 5.30% % $\Delta Q$ = -2.65% $\Delta Sales$ = -68,165 Jobs Lost = -1,264	% $\Delta Cost$ = 7.95% % $\Delta Q$ = -3.98% $\Delta Sales$ = -102,247 Jobs Lost = -1,897
-0.92	% $\Delta Cost$ = 2.65% % $\Delta Q$ = -2.44% $\Delta Sales$ = -62,711 Jobs Lost = -1,163	% $\Delta Cost$ = 5.30% % $\Delta Q$ = -4.88% $\Delta Sales$ = -125,423 Jobs Lost = -2,326	% $\Delta Cost$ = 7.95% % $\Delta Q$ = -7.31% $\Delta Sales$ = -188,134 Jobs Lost = -3,490
-1.5	% $\Delta Cost$ = 2.65% % $\Delta Q$ = -3.98% $\Delta Sales$ = -102,247 Jobs Lost = -1,897	% $\Delta Cost$ = 5.30% % $\Delta Q$ = -7.95% $\Delta Sales$ = -204,494 Jobs Lost = -3,793	% $\Delta Cost$ = 7.95% % $\Delta Q$ = -11.93% $\Delta Sales$ = -306,740 Jobs Lost = -5,690

Table 6 presents the sensitivity analysis, which varies both the share of unauthorized workers removed (25, 50, and 75 percent) and the short-run cost elasticity of supply (-0.5, -0.92, -1.5). Under the most conservative case (-0.5 elasticity, 25 percent removal), output declines by 1.3 percent, equal to about \$34 million in lost sales and more than 600 jobs. At the upper bound (-1.5 elasticity, 75 percent removal), output falls by nearly 12 percent, translating to \$307 million in lost sales and over 5,600 jobs lost. Across all scenarios, the FV sector proves vulnerable to labor supply shocks, though the absolute

magnitude of losses is smaller than in NGF due to a lower labor cost share and less elastic short-run supply response. Nevertheless, the findings make clear that large-scale removal of unauthorized workers would have substantial negative effects on production, revenues, and employment in Florida's fruit and vegetable industry.

## 5 Looking Ahead: Adaptation and Policy Considerations

### 5.1 Automation and Mechanization

While NGF and many FV crops are labor-intensive by nature, advances in robotics, AI-assisted crop monitoring, and automated transplanting/harvesting offer partial solutions. However, the capital costs are high, the technology adoption curve is slow, and full mechanization is often not technically feasible for delicate ornamental plants or fresh produce. While advances in AI and agricultural robotics are progressing, the technical and economic barriers to full automation, particularly in labor-intensive specialty crop and ornamental plant production, remain substantial (also see Devadoss 2026). As a result, large-scale replacement of human labor across these sectors is unlikely in the foreseeable future. Therefore, in the short run, automation is more likely to supplement rather than replace labor.

### 5.2 Guest Worker Programs (H-2A Visas)

The H-2A program already supplies a growing share of seasonal farm labor in Florida, particularly for FV operations. Streamlining application procedures and expanding the program could help offset deportation-related labor losses. However, the current process is expensive, administratively complex, and often ill-suited to year-round NGF work (Devadoss and Luckstead 2026). Any meaningful role for H-2A in the NGF sector would require policy changes allowing longer-term or permanent visa categories.

### 5.3 Trade and Market Shifts

Labor cost shocks can weaken Florida's competitiveness in both domestic and export markets. For NGF products, higher production costs could lead to increased imports from Latin America and Asia, where labor costs are significantly lower and production conditions are increasingly competitive. The US industry is already facing growing pressure from these regions, particularly in cut flowers, foliage plants, and other high-value nursery products. In the FV sector, import competition from Mexico, Central America, and the Caribbean could accelerate, particularly in crops where Florida already faces price pressure. These shifts would not only affect producers but also ripple through the state's supply chain, impacting input suppliers, transportation, and retail sectors.

### 5.4 Implications for Policy

The analysis underscores the need for a multi-pronged policy approach: modernizing guest worker programs, supporting selective automation R&D, and providing targeted support for high-labor-share sectors during labor market shocks. Without proactive measures, large-scale deportation could cause enduring structural changes in Florida agriculture.

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